

Exhibit 1

1 UNITED STATES DISTRICT COURT
2 NORTHERN DISTRICT OF CALIFORNIA
3 SAN FRANCISCO DIVISION
4

5 ORACLE AMERICA,

6 Plaintiff,

7 vs.

CASE NO. 3:10-cv-03561-WHA

8 GOOGLE, INC.,

9 Defendant.
10
11

12 VIDEOTAPED DEPOSITION OF ROHIT CHATTERJEE

13 San Francisco, California

14 Thursday, April 28, 2016

15 Volume I
16
17
18
19
20
21

22 Reported by:

LORI STOKES

23 CSR No. 12732

24 Job No. 2302034

25 Pages 1 - 296

<p style="text-align: right;">Page 46</p> <p>1 asked you who helped you with the Python scripts. 2 Maybe I hadn't. 3 Who helped you write the Python scripts? 4 A Again, similar answer where I -- Mohamed 5 helped me with sort of consulting on certain method 6 calls or something which he remembered more than 7 me. 8 Q Did anyone else besides Mohamed and 9 Dr. Kemerer help you write the Python scripts? 10 A And the documentation. I relied on the 11 documentation. Yes. 12 Q Okay. So in order to write the Python 13 scripts, you relied on the documentation and 14 assistance from Dr. Kemerer and from Mohamed, 15 correct? 16 A Yes. But the -- yeah. Yep. 17 Q Okay. And did you yourself write those 18 Python scripts? 19 A I did, yes. 20 Q Okay. What other scripts did you write 21 in connection with Dr. Kemerer's report besides the 22 R scripts, the Python scripts and the PHP scripts? 23 A I'm trying to recall. There are many 24 scripts, so -- I think those were the primary ones. 25 Q Okay. Have you ever developed an app for</p>	<p style="text-align: right;">Page 48</p> <p>1 Q What did the app do? 2 MR. RAMSEY: Objection. Form. 3 THE WITNESS: I mean, something very 4 simple and stupid. It was literally printing out 5 Hello World or something. I just wanted to learn 6 how to write an Android app, like an absolute basic 7 Android app, so something very basic. 8 BY MR. PAIGE: 9 Q Do you consider yourself to be fluid in 10 Android apps -- fluent, rather? 11 MR. RAMSEY: Objection. Form. 12 THE WITNESS: I have written an Android 13 app. I don't know if that makes me fluent one way 14 or the other. 15 BY MR. PAIGE: 16 Q Well, is it your view that writing a 17 simple Android app makes you fluent in Android? 18 MR. RAMSEY: Objection. Form. 19 THE WITNESS: It could. I mean, it 20 depends on -- I mean, I guess the complexity of the 21 app or -- there could be other factors. How much 22 I've spent time in investigating about learning 23 about how to develop apps. It really depends. I 24 can't tell you one way or the other. 25</p>
<p style="text-align: right;">Page 47</p> <p>1 Android? 2 A For Android. Maybe a very basic app. I 3 mean, nothing fancy. But it was two, three years 4 back, I was playing around. And I built something 5 which would work, yeah. 6 Q So the answer is yes, you've developed an 7 app for Android? 8 A Yes. I mean, it's not the -- not a fancy 9 app or anything -- yeah. 10 Q Is it on Google Play now? 11 A It's not on Google Play, no. 12 Q Have you distributed it at all? 13 A No, I have not distributed it at all. 14 Q And you wrote this app two or three years 15 ago, right? 16 A Yeah, about that time, yeah. 17 Q Have you written any other Android apps? 18 A No, I don't think I've written any other 19 Android apps. 20 Q What language did you write the Android 21 app in? 22 A I think I used Java for that. 23 Q Are you sure? 24 A It's been a while. Most likely used 25 Java.</p>	<p style="text-align: right;">Page 49</p> <p>1 BY MR. PAIGE: 2 Q How much time have you spent 3 investigating how to develop apps? 4 MR. RAMSEY: Objection. Form. 5 THE WITNESS: Investigating. Generally 6 very curious side, I read about how to do stuff. I 7 don't know if I have an aggregate number to tell 8 you, but -- I don't know. I can't tell you. 9 I mean, I've read about like app 10 development and building apps, done a little bit of 11 it myself, but I can't tell you -- if I can give 12 you an exact number on how much time I've spent 13 doing this stuff. 14 BY MR. PAIGE: 15 Q Well, I just want a ballpark. Has it 16 been about a week of your life? A day of your 17 life? A month of your life? 18 A It could be months. I mean, it's -- or 19 first of all, it was a long time back, but I keep 20 learning about it. I read about things. So it's 21 over the course of maybe a few years, I've -- but I 22 don't know like if you aggregate them, how much 23 time it would sort of add up to in a month, or two 24 months, three months. I just don't know. 25 Q You don't consider yourself an Android</p>

<p style="text-align: right;">Page 58</p> <p>1 BY MR. PAIGE:</p> <p>2 Q Okay. Would you agree that if changes to</p> <p>3 APIs do not result in any issue with backwards</p> <p>4 compatibility that the changes will not cause</p> <p>5 problems for developers?</p> <p>6 MR. RAMSEY: Objection. Form.</p> <p>7 THE WITNESS: Could you restate that</p> <p>8 again? It was a long sentence.</p> <p>9 BY MR. PAIGE:</p> <p>10 Q Would you agree that if changes to APIs</p> <p>11 do not result in any issues with backwards</p> <p>12 compatibility that the changes will not cause</p> <p>13 problems for developers?</p> <p>14 MR. RAMSEY: Objection. Form.</p> <p>15 THE WITNESS: There could be other</p> <p>16 issues, also. I don't know -- I don't know one way</p> <p>17 or the other if backwards compatibility is the only</p> <p>18 reason why it would cause some problems. I just</p> <p>19 don't know.</p> <p>20 BY MR. PAIGE:</p> <p>21 Q Does your analysis reveal whether the</p> <p>22 APIs you examined are backwards compatible?</p> <p>23 MR. RAMSEY: Objection. Form.</p> <p>24 THE WITNESS: I did not conduct any</p> <p>25 analysis. The data that I was asked to collect, I</p>	<p style="text-align: right;">Page 60</p> <p>1 MR. RAMSEY: Sure.</p> <p>2 BY MR. PAIGE:</p> <p>3 Q Do you believe you have expertise</p> <p>4 relevant to this case?</p> <p>5 MR. RAMSEY: Objection. Form.</p> <p>6 THE WITNESS: I have -- I have expertise</p> <p>7 conducting some of the things that I was asked to</p> <p>8 do in this particular case.</p> <p>9 BY MR. PAIGE:</p> <p>10 Q So what is the expertise that you have</p> <p>11 that is relevant to this case?</p> <p>12 A I have an understanding of -- of how to</p> <p>13 sort of collect these types of data, writing</p> <p>14 scripts, to do that. I have expertise in sort of</p> <p>15 like usage of some tools that I've used in this</p> <p>16 particular -- the recollection effort.</p> <p>17 I have -- like I said, I've done Java</p> <p>18 programming before. I have programmed in different</p> <p>19 languages before. And so all of those, I think,</p> <p>20 are relevant to the work that I've done.</p> <p>21 Q Do you have any expertise in deciding</p> <p>22 what sort of changes would matter to developers?</p> <p>23 MR. RAMSEY: Objection. Form.</p> <p>24 THE WITNESS: I don't have like specific</p> <p>25 expertise in sort of designing that particular</p>
<p style="text-align: right;">Page 59</p> <p>1 mean, had deprecated code in them. So I would</p> <p>2 guess that that would cover backward compatibility</p> <p>3 in some sense.</p> <p>4 Again, I'm -- I haven't really thought</p> <p>5 about backward compatibility as a separate issue,</p> <p>6 so I can't really comment on that.</p> <p>7 BY MR. PAIGE:</p> <p>8 Q Could you determine from the data you</p> <p>9 collected whether the APIs are backwards</p> <p>10 compatible?</p> <p>11 MR. RAMSEY: Objection. Form.</p> <p>12 THE WITNESS: I would need to know what</p> <p>13 the definition of backward compatibility is in this</p> <p>14 particular context. I would have to go back and</p> <p>15 see if the data actually contained those -- the</p> <p>16 contours that are defined in that particular</p> <p>17 definition of backward compatibility, and then I</p> <p>18 would check it that way.</p> <p>19 But I can't -- I don't know.</p> <p>20 MR. PAIGE: Okay.</p> <p>21 MR. RAMSEY: Can we take a break when you</p> <p>22 get a chance, just whenever it's convenient for</p> <p>23 coffee? No particular rush.</p> <p>24 MR. PAIGE: Sure. Just a few more</p> <p>25 questions.</p>	<p style="text-align: right;">Page 61</p> <p>1 metric at this time. Or I haven't done that. But</p> <p>2 I can think about it if I was asked to do that.</p> <p>3 MR. PAIGE: Okay. Let's take a break.</p> <p>4 THE VIDEOGRAPHER: Going off the record.</p> <p>5 The time is 10:07.</p> <p>6 (Short break taken.)</p> <p>7 THE VIDEOGRAPHER: Back on the record.</p> <p>8 The time is 10:17.</p> <p>9 BY MR. PAIGE:</p> <p>10 Q Mr. Chatterjee, welcome back.</p> <p>11 A Thank you.</p> <p>12 Q You understand that you're still under</p> <p>13 oath, correct?</p> <p>14 A Sorry?</p> <p>15 Q You understand that you're still under</p> <p>16 oath, correct?</p> <p>17 A I am. I do.</p> <p>18 Q Okay. What work did you do on</p> <p>19 Dr. Kemerer's report?</p> <p>20 MR. RAMSEY: Objection. Form.</p> <p>21 THE WITNESS: I -- he had asked me to</p> <p>22 collect data that he wanted to do for his own</p> <p>23 analysis, helped him sort of gather that data.</p> <p>24 BY MR. PAIGE:</p> <p>25 Q What specific portions of Dr. Kemerer's</p>

<p style="text-align: right;">Page 62</p> <p>1 report did you work on?</p> <p>2 MR. RAMSEY: Objection. Form.</p> <p>3 THE WITNESS: The stability analysis that</p> <p>4 he was conducting, I helped gather that data.</p> <p>5 BY MR. PAIGE:</p> <p>6 Q And what else did you help him with?</p> <p>7 A The -- I believe the centrality analysis</p> <p>8 that he conducted, I helped gather some of the data</p> <p>9 for that, as well.</p> <p>10 Q And what else did you do to help</p> <p>11 Dr. Kemerer on his report?</p> <p>12 A He had asked me to collect some papers,</p> <p>13 publications, sometimes asked me to do research on</p> <p>14 specific topics. Helped him sort of like gather</p> <p>15 that information for him, as well.</p> <p>16 Q And what else did you do to help him on</p> <p>17 his report?</p> <p>18 MR. RAMSEY: Objection. Form.</p> <p>19 THE WITNESS: I mean, draw graphs, put</p> <p>20 things in tables, things like that.</p> <p>21 BY MR. PAIGE:</p> <p>22 Q Is there anything else that you did to</p> <p>23 help Dr. Kemerer with his report?</p> <p>24 MR. RAMSEY: Objection. Form.</p> <p>25 THE WITNESS: I can't recall right now.</p>	<p style="text-align: right;">Page 64</p> <p>1 THE WITNESS: I think he was conducting</p> <p>2 the -- like the Android build tests, and I was</p> <p>3 helping him do that, as well.</p> <p>4 BY MR. PAIGE:</p> <p>5 Q How did you help him with the Android</p> <p>6 build tests?</p> <p>7 A He -- he wanted me to sort of build</p> <p>8 Android using the -- help him build Android using</p> <p>9 the standard documentation that Google provides.</p> <p>10 And I worked with him to sort of do that.</p> <p>11 I was -- he was telling me he spent a lot</p> <p>12 of time thinking about Android, and so he would</p> <p>13 instruct me, and I would do that particular test</p> <p>14 for him.</p> <p>15 Q You actually ran the builds for</p> <p>16 Dr. Schmidt; is that right?</p> <p>17 A He was with me. Most of the time he was</p> <p>18 around. Sometimes when the tests were running, it</p> <p>19 would take maybe hours to do. And I wouldn't</p> <p>20 sometimes be in the same room as he would on those</p> <p>21 situations, but yeah, he was -- he was always</p> <p>22 around.</p> <p>23 And so I would say I did it with him.</p> <p>24 He -- he was the one who was doing most of the --</p> <p>25 he was putting his thoughts on the steps more than</p>
<p style="text-align: right;">Page 63</p> <p>1 BY MR. PAIGE:</p> <p>2 Q Did you work on anyone else's report in</p> <p>3 this case?</p> <p>4 A I supported one more expert, yes.</p> <p>5 Q Who is that?</p> <p>6 A Professor Schmidt, Douglas C. Schmidt, I</p> <p>7 think.</p> <p>8 Q What did you do to help Dr. Schmidt with</p> <p>9 his report?</p> <p>10 MR. RAMSEY: Objection. Form.</p> <p>11 THE WITNESS: Again, he asked me to -- in</p> <p>12 many cases, asked me to find him a particular</p> <p>13 paper, publication, things like that.</p> <p>14 BY MR. PAIGE:</p> <p>15 Q What else did you do for Dr. Schmidt's</p> <p>16 report?</p> <p>17 MR. RAMSEY: Objection. Form.</p> <p>18 THE WITNESS: Again, sometimes he asked</p> <p>19 me to help him do a particular analysis with him.</p> <p>20 I was helping him with some of the stuff that he</p> <p>21 needed for his report.</p> <p>22 BY MR. PAIGE:</p> <p>23 Q What particular analyses did you help</p> <p>24 Dr. Schmidt with?</p> <p>25 MR. RAMSEY: Objection. Form.</p>	<p style="text-align: right;">Page 65</p> <p>1 me, honestly.</p> <p>2 Q And when you say you were with him, where</p> <p>3 were you physically located at that time?</p> <p>4 A In Boston sometimes. Sometimes in -- I</p> <p>5 think I met him in New York, as well, once.</p> <p>6 Q So he would come to visit you in Boston;</p> <p>7 is that right?</p> <p>8 A Sometimes, yes.</p> <p>9 Q How many times?</p> <p>10 A Maybe a couple of times.</p> <p>11 Q How long did he stay?</p> <p>12 A A day. Yeah.</p> <p>13 Q And when you were in New York, where were</p> <p>14 you working?</p> <p>15 A We have an office in downtown, but I</p> <p>16 don't know if he actually went there. But we also</p> <p>17 met at the Orrick New York office, as well.</p> <p>18 Q How long were you there at the Orrick New</p> <p>19 York offices together?</p> <p>20 A A few days. This was leading up to</p> <p>21 the -- one of the report submissions, I spent some</p> <p>22 time there with him.</p> <p>23 Q Was it in January, or was it in February?</p> <p>24 A I think it was in -- it's now all muddled</p> <p>25 up. It's probably February is my guess, yeah.</p>

<p style="text-align: right;">Page 78</p> <p>1 Q Who is that partner?</p> <p>2 A Jeff Marowits.</p> <p>3 Q And who is Mr. Marowits?</p> <p>4 A He's a partner at Keystone Strategy.</p> <p>5 Q Where does he office?</p> <p>6 A He's based out of New York.</p> <p>7 Q And he is the one who brought in the</p> <p>8 client?</p> <p>9 A Again, I don't know who brought in the</p> <p>10 client one way or the other, but you asked me about</p> <p>11 like who was initially involved. So I -- he</p> <p>12 helped -- he staffed me on this particular matter,</p> <p>13 so I would guess he would be involved.</p> <p>14 Q And you don't know who the bills for</p> <p>15 Keystone go to?</p> <p>16 A I don't.</p> <p>17 Q Have you worked with Dr. Jaffe in this</p> <p>18 case?</p> <p>19 A I have not.</p> <p>20 Q Have you worked with Dr. Zeidman in this</p> <p>21 case?</p> <p>22 A I have not.</p> <p>23 Q Have you ever spoken with Dr. Jaffe?</p> <p>24 A I have.</p> <p>25 Q In what context?</p>	<p style="text-align: right;">Page 80</p> <p>1 Q Very little.</p> <p>2 So you have spoken with him some about</p> <p>3 this case, right?</p> <p>4 A I've been in the same room as him</p> <p>5 sometimes. But I think -- like I said, I've not</p> <p>6 directly supported him in any way in this</p> <p>7 particular matter.</p> <p>8 Q Let me make sure I understand.</p> <p>9 You've been in the same room with him</p> <p>10 when you are both working on this case; is that</p> <p>11 right?</p> <p>12 A That's right.</p> <p>13 Q Okay. And when was that?</p> <p>14 A Probably in the -- one of the report</p> <p>15 submission times. I can't recall exactly.</p> <p>16 Probably -- either January, maybe.</p> <p>17 Q And where was that?</p> <p>18 A I'm trying to think. San Francisco,</p> <p>19 maybe. Yes -- yeah, it's probably San Francisco.</p> <p>20 Q How many times previously have you worked</p> <p>21 with Dr. Kemerer?</p> <p>22 A I haven't worked with Dr. Kemerer before</p> <p>23 this.</p> <p>24 Q Would you describe yourself as a research</p> <p>25 assistant to Dr. Kemerer?</p>
<p style="text-align: right;">Page 79</p> <p>1 A In a separate engagement, I've spoken</p> <p>2 with him.</p> <p>3 Q How many times?</p> <p>4 A Maybe two times before, yeah.</p> <p>5 Q But you haven't spoken with him at all in</p> <p>6 connection with this case?</p> <p>7 A I can't recall. I don't -- I can't</p> <p>8 recall if I spoke with him, but I don't think so.</p> <p>9 Q Have you spoken with Dr. Zeidman?</p> <p>10 A I have spoken with Dr. -- I think</p> <p>11 Mr. Zeidman.</p> <p>12 Q Mr. Zeidman. I'm sorry, Mr. Zeidman,</p> <p>13 you're correct.</p> <p>14 A I have.</p> <p>15 Q In what context have you spoken with</p> <p>16 Mr. Zeidman?</p> <p>17 A In other -- in a different matter.</p> <p>18 Again, I was speaking with him on a different</p> <p>19 matter.</p> <p>20 Q Okay. And you don't have any</p> <p>21 communications with him related to this case; is</p> <p>22 that right?</p> <p>23 A I've -- very little, I would say. Very</p> <p>24 little. I don't have an extensive sort of exposure</p> <p>25 to him.</p>	<p style="text-align: right;">Page 81</p> <p>1 A For the work I did, I would describe it</p> <p>2 so.</p> <p>3 Q How many times previously have you worked</p> <p>4 with Dr. Schmidt?</p> <p>5 A I haven't worked with Dr. Schmidt before.</p> <p>6 Q How many times previously have you worked</p> <p>7 with Dr. Jaffe?</p> <p>8 MR. RAMSEY: Objection. Form.</p> <p>9 THE WITNESS: Maybe once -- I mean, I</p> <p>10 haven't done any work with him in this particular</p> <p>11 matter. But prior to this, I spoke with him a</p> <p>12 couple of times before.</p> <p>13 BY MR. PAIGE:</p> <p>14 Q You've worked with him before, correct?</p> <p>15 A I worked with him in the sense I -- there</p> <p>16 was a few phone calls that I was on with him.</p> <p>17 Q You were giving him expert support at</p> <p>18 that time, right?</p> <p>19 A Not really, actually. I was actually</p> <p>20 asking for his opinion on certain things.</p> <p>21 So I wasn't really supporting him.</p> <p>22 Q Okay. How many times previously have you</p> <p>23 worked with Mr. Zeidman?</p> <p>24 A So I haven't supported Mr. Zeidman</p> <p>25 before. I haven't done it here, as well. But I</p>

<p style="text-align: right;">Page 82</p> <p>1 have, again, in a similar context where I had asked 2 him for some -- a particular opinion on a 3 particular case, but I don't think that case even 4 got too far. 5 Q Did Keystone hire Dr. Kemerer? 6 A I -- like I said, I don't know what 7 happened in the initial conversations. But I know 8 Dr. Kemerer knew some folks at Keystone. 9 Q Did Dr. Kemerer hire Keystone? 10 A Again, I don't know. It could be. I 11 don't know one way or the other. I wasn't involved 12 in the initial part of the work. 13 Q Who would know if Dr. Kemerer hired 14 Keystone or Keystone hired Dr. Kemerer? 15 A Someone who was involved in the early 16 discussions. 17 Q And who are those people? 18 A Like I said, I don't know too many -- 19 like who exactly -- Jeff Marowits contacted me on 20 this particular matter, so he would be a starting 21 point, but I don't know exactly. 22 Q So aside from Jeff Marowits, you have no 23 idea who would know the answer to this question? 24 A I'm sure -- I would guess the CEO of the 25 company would know, but I don't know.</p>	<p style="text-align: right;">Page 84</p> <p>1 Q So did he become one of your experts 2 based on this call you gave to him? 3 A That was a start. I don't know if I 4 would characterize that as he became an expert 5 after that. But I had some questions, like I said. 6 That was a starting point. 7 Q Who hired Dr. Schmidt at Keystone? 8 MR. RAMSEY: Objection. Form. 9 THE WITNESS: I was the one who initially 10 called him. And we have a formal process of 11 engaging experts. So someone else did that, but I 12 was the one sort of bringing him on board. 13 BY MR. PAIGE: 14 Q So you hired him? 15 A I don't know how I would characterize -- 16 like I don't -- I'm not paying bills or anything of 17 that sort. But Keystone ultimately, I guess, hired 18 him. 19 But I was initially responsible for 20 bringing him on board. 21 Q Did you write him an offer letter? 22 A An offer letter, no. 23 Q When did Dr. Schmidt become a Keystone 24 expert? 25 MR. RAMSEY: Objection. Form.</p>
<p style="text-align: right;">Page 83</p> <p>1 Q Who is the CEO of the company? 2 A Greg Richards. 3 Q Where is Greg Richards based? 4 A New York. 5 Q Did Keystone hire Dr. Schmidt? 6 A I -- yes, I think his -- he is one of our 7 experts, yes. 8 Q When you say he is one of our experts, 9 what do you mean? 10 A In the sense that he's sort of -- I'm 11 guessing, his invoicing goes through us, yeah. 12 Q And why do you guess that? 13 A Because I was initially involved in 14 bringing him on board. 15 Q I see. How were you involved in bringing 16 him on board initially? 17 A We had some questions on -- I had some 18 questions on Android, so I had -- I was looking up 19 a MOOC, M-O-O-C on Android, and he was the one who 20 was teaching, so I gave him a call to ask some 21 questions. 22 Q And prior to you calling him, was he an 23 employee of Keystone? 24 A No, but he is -- he's one of our experts 25 now.</p>	<p style="text-align: right;">Page 85</p> <p>1 THE WITNESS: He started working on the 2 case, let's say -- let's characterize it that way. 3 He started working on the case probably 4 maybe middle of -- early December or middle of 5 December. Could be end of November, as well. I 6 can't remember right now. 7 BY MR. PAIGE: 8 Q Sorry, my question was a little 9 different. 10 A Sorry. 11 Q When did Dr. Schmidt become an employee 12 of Keystone? 13 MR. RAMSEY: Objection. Form. 14 THE WITNESS: He's not an employee of 15 Keystone; he's just an expert affiliated to 16 Keystone. 17 BY MR. PAIGE: 18 Q Okay. He's an independent contractor 19 with Keystone? 20 MR. RAMSEY: Objection. Form. 21 THE WITNESS: He is an independent 22 contractor with Keystone. I think. I don't know 23 exactly the contractual terms, but he's a processor 24 at Vanderbilt. We don't have like in-house 25 Keystone experts. That's how I would characterize</p>

<p style="text-align: right;">Page 90</p> <p>1 Q Sure. And who else?</p> <p>2 A That's about it.</p> <p>3 Q Okay. You said Jeff Marowits is one of</p> <p>4 them, so I was thinking there was a second one.</p> <p>5 A Greg Richards was the second one in terms</p> <p>6 of being the CEO of the company.</p> <p>7 Q And do you actually report to him on this</p> <p>8 case?</p> <p>9 A Sometimes. I mean, he asks me how things</p> <p>10 are going and things like that. In that sense, I</p> <p>11 do report to him, yes.</p> <p>12 Q Okay. So the CEO has asked you about</p> <p>13 this case specifically?</p> <p>14 A Yeah. I mean, in general about how</p> <p>15 things are going and -- yeah.</p> <p>16 Q No, no, not generally how things are</p> <p>17 going, about this case, right?</p> <p>18 MR. RAMSEY: Objection. Form.</p> <p>19 THE WITNESS: I mean, my -- he's</p> <p>20 concerned about me, and he would ask me questions</p> <p>21 about me, which are like -- I mean, in some sense</p> <p>22 related to the case.</p> <p>23 BY MR. PAIGE:</p> <p>24 Q Does anyone report to you at Keystone?</p> <p>25 A We don't have like formal reporting</p>	<p style="text-align: right;">Page 92</p> <p>1 Q Do you personally get paid differently</p> <p>2 depending on the occurrence of any events in the</p> <p>3 case?</p> <p>4 A No.</p> <p>5 Q When did you first meet Dr. Kemerer?</p> <p>6 A Back in October, when I mentioned I</p> <p>7 started working on the case.</p> <p>8 Q And where was that first meeting?</p> <p>9 A I can't be sure. It's been a while.</p> <p>10 Probably Pittsburgh.</p> <p>11 Q Now, are you aware that last Thursday,</p> <p>12 April 21st, the Orrick firm produced to us certain</p> <p>13 files that they say were used in Keystone's</p> <p>14 stability and centrality analyses?</p> <p>15 A We produced some files. I don't know if</p> <p>16 I would characterize them as Keystone's analysis.</p> <p>17 They're Professor Kemerer's analysis, the data for</p> <p>18 that, I think, and the data steps that I took to do</p> <p>19 that work I think were produced in entirety as much</p> <p>20 as I could.</p> <p>21 Q So the answer is yes, you are aware of</p> <p>22 that production being made?</p> <p>23 A Yes.</p> <p>24 Q How are you aware of that?</p> <p>25 A I was asked to make sure I put in all the</p>
<p style="text-align: right;">Page 91</p> <p>1 structures, like I said. I mean, it completely</p> <p>2 varies from project to project.</p> <p>3 Q Does Keystone have any interest in the</p> <p>4 outcome of this case?</p> <p>5 A I don't know for a fact because I wasn't</p> <p>6 involved, again, in invoicing and all that stuff.</p> <p>7 But typically, we don't take an interest stake in</p> <p>8 the outcome.</p> <p>9 Q But you have in the past taken interest</p> <p>10 in outcomes?</p> <p>11 MR. RAMSEY: Objection. Form.</p> <p>12 THE WITNESS: I haven't been in a single</p> <p>13 situation where this has happened.</p> <p>14 BY MR. PAIGE:</p> <p>15 Q Keystone has been in situations where</p> <p>16 that has happened in the past, though, correct?</p> <p>17 MR. RAMSEY: Objection. Form.</p> <p>18 THE WITNESS: I would highly doubt that.</p> <p>19 BY MR. PAIGE:</p> <p>20 Q Does Keystone get paid differently</p> <p>21 depending on the occurrence of certain events in</p> <p>22 the case?</p> <p>23 A In this particular matter you're saying</p> <p>24 specifically? Again, I don't know. But again, I</p> <p>25 would guess not.</p>	<p style="text-align: right;">Page 93</p> <p>1 files that I actually worked on in a particular</p> <p>2 folder and give it to folks at Orrick.</p> <p>3 Q So were you involved in collecting the</p> <p>4 documents that were produced?</p> <p>5 A I was involved.</p> <p>6 Q Did you yourself actually collect those</p> <p>7 documents?</p> <p>8 A I did. Some of them were my scripts. I</p> <p>9 did collect them.</p> <p>10 Q Where were they located?</p> <p>11 A Usually we have specific computers to run</p> <p>12 specific scripts. So we -- I would have located</p> <p>13 them in those local computers. I would keep them</p> <p>14 sometimes in my own personal laptop. So different</p> <p>15 places put them together.</p> <p>16 Q Where were these computers that held the</p> <p>17 scripts, physically?</p> <p>18 A Different places. So we have New York,</p> <p>19 Boston -- sorry, not New York, I guess.</p> <p>20 San Francisco and Boston.</p> <p>21 Q And did you travel to the San Francisco</p> <p>22 or Boston -- I'm sorry, San Francisco or New York</p> <p>23 to get those scripts?</p> <p>24 A No, sorry. I misspoke earlier. It's not</p> <p>25 New York; it's Boston and San Francisco are the</p>

<p style="text-align: right;">Page 98</p> <p>1 A Like I said, sometimes I have to -- like 2 for the web archives, I had to download this 3 information more recently. And I just produced 4 those, so those would have recent timestamp on 5 them. 6 Q But other files have recent timestamps on 7 them as well, correct? 8 A I mean, if you -- it could be that you 9 save a particular file, and you move one file for 10 another file. It would have an updated timestamp. 11 Q So you're saying the documents you 12 produced to us haven't been changed in any way from 13 what you used to run your analysis; is that right? 14 A Yeah, I don't believe -- 15 Q I'm sorry? 16 A I don't believe the files have changed in 17 any way from what was used for the data collection 18 efforts. 19 Q You don't believe. Do you know they 20 haven't been changed in any way? 21 A Pretty confident that they haven't been 22 changed. 23 Q Why are you confident? 24 A Because like I said, I marked out the 25 ones that I told you are possibly -- have possibly</p>	<p style="text-align: right;">Page 100</p> <p>1 possible, so I tried to give as much as I had with 2 me. So that's what I tried to do. 3 Q Okay. 4 A So there might be things which -- 5 which -- I mean, literally to the point, I mean, I 6 wrote something on a command line. I made sure 7 that I passed that on to you, which anyone would be 8 able to do on their own, as well. But I wanted 9 that to go to you. 10 Q And are you aware that on Monday, the 11 25th, the Orrick firm produced to us certain files 12 replacing and supplementing those files again? 13 A I believe so. But I can't be -- I wasn't 14 there, I was on the flight, so I don't know exactly 15 when -- if it was submitted on Monday or not. 16 Q Do you know why these things were 17 submitted on Monday? 18 MR. RAMSEY: Objection. Form. 19 THE WITNESS: Again, it might be the same 20 thing, which is I wanted to make sure that the 21 information was complete, as much as I can. 22 So I -- I might have -- there might be 23 some errors which I corrected. I just can't 24 remember the exact dates when things happened. But 25 there were certain read me files which I felt were</p>
<p style="text-align: right;">Page 99</p> <p>1 been recently re-downloaded, but I'm pretty 2 confident the data in the ones that I provided are 3 the ones that went into the analysis that 4 Dr. Kemerer ran. 5 Q Now, are you aware that last Friday, 6 April 22nd, the Orrick firm produced to us certain 7 files replacing and supplementing the files that 8 were produced on the 21st? 9 A I believe so, yes. 10 Q Okay. Why did that happen? 11 A When I was writing the read me files, for 12 example, I copy pasted certain -- certain -- I 13 mean, a set of instructions that I was providing, I 14 had not used that particular -- I mean, I just copy 15 pasted, and they were not correct, so I want to 16 make sure that I provide the right sort of 17 information. So it was just an error on my part. 18 Q There were also files supplemented on 19 that date, right? 20 A You mean new files? 21 Q Yes, I do. 22 A There could have been. I'm not -- I 23 can't remember right now what was supplemented or 24 not on the next turn. I -- like I said, my purpose 25 was to make sure that I'd be as helpful as</p>	<p style="text-align: right;">Page 101</p> <p>1 not accurately expressing the steps that were 2 followed, and so I revised some of those. So I 3 just don't know what the -- sorry. 4 I don't know exactly what changed, what 5 didn't change, that kind of stuff. 6 BY MR. PAIGE: 7 Q When did you revise these read me files 8 and so on? 9 A Sometime over the weekend. 10 Q Saturday? Sunday? 11 A Can't recall, honestly. I don't know one 12 way or the other. Could be one of the days. I 13 just don't know. 14 Q Do you know that it was Saturday or 15 Sunday? 16 A I don't. 17 Q Really? You don't remember what you did 18 this weekend? 19 A I had a lot of things going on with a 20 personal friend as well, so... 21 MR. PAIGE: We need to change the DVD, so 22 let's take a break. 23 THE VIDEOGRAPHER: This marks the end of 24 Volume I, Media Number 1 of the deposition of Rohit 25 Chatterjee. The time is 11:08 a.m. We're off the</p>

<p style="text-align: right;">Page 134</p> <p>1 Q So data manipulation for v1-13.R, is that</p> <p>2 what does the R script for API levels 1 through 13?</p> <p>3 A It is used in the -- yes. It is used in</p> <p>4 the -- sort of like changing the data format for v1</p> <p>5 to 13, yes.</p> <p>6 Q And what is used for API levels 14</p> <p>7 through 23?</p> <p>8 A I used a PHP scraper parser.</p> <p>9 Q Where is that PHP parser?</p> <p>10 A I think I -- can I refer back to that?</p> <p>11 Q Sure, of course.</p> <p>12 A We talked about the PHP parsing scripts.</p> <p>13 I have to go back to...</p> <p>14 This one here, I think, parse v3.PHP...</p> <p>15 Commented.PHP are the parsing scripts.</p> <p>16 Q So there is no R script that was run for</p> <p>17 API levels 14 through 23?</p> <p>18 MR. RAMSEY: Objection. Form.</p> <p>19 THE WITNESS: API levels 14 through 23, I</p> <p>20 did run -- let's see. I did run the R script for</p> <p>21 API level -- was it for 13 specifically?</p> <p>22 So ultimately -- let me just explain the</p> <p>23 process. All of these API levels 1 to 13 or 14 to</p> <p>24 23 then got combined and was -- was sent through</p> <p>25 another R script.</p>	<p style="text-align: right;">Page 136</p> <p>1 in there. But I need to open up the folder to take</p> <p>2 a look.</p> <p>3 Q Is that API levels 13 and 14?</p> <p>4 A That's right, yeah.</p> <p>5 Q Why is there something specific for those</p> <p>6 API levels?</p> <p>7 A The file format changed, like I showed</p> <p>8 you, XML, from API levels 1 through 13. And 14</p> <p>9 onwards, I think it's the TXT format. Just to make</p> <p>10 sure that the XML format -- whenever there's a</p> <p>11 change in format, I want to make sure that at the</p> <p>12 inflection point, whenever the change happens, the</p> <p>13 data is accurately captured. So I just ran it for</p> <p>14 13 and 14 specifically.</p> <p>15 MR. PAIGE: Exhibit 1602, please.</p> <p>16 (Deposition Exhibit 1602 was marked for</p> <p>17 identification by the court reporter.)</p> <p>18 BY MR. PAIGE:</p> <p>19 Q Mr. Chatterjee, I've put before you</p> <p>20 Exhibit 1602, which is the contents of folder 12</p> <p>21 Understand Scripts.</p> <p>22 Could you tell me what's in this folder,</p> <p>23 please, sir?</p> <p>24 A There's Python scripts -- primarily</p> <p>25 Python scripts, there's a read me file. There's</p>
<p style="text-align: right;">Page 135</p> <p>1 So yes, in that respect, the 14 to 23</p> <p>2 data also got through the R scripts.</p> <p>3 BY MR. PAIGE:</p> <p>4 Q Where is the other R script through which</p> <p>5 that data is sent?</p> <p>6 A This one here, JDK stability analysis.R.</p> <p>7 Q So you ran the Android code through JDK</p> <p>8 stability analysis.R?</p> <p>9 A Oh, sorry. I misspoke.</p> <p>10 It's a similar file. I don't know if</p> <p>11 the -- it's not the JDK. It's probably -- this</p> <p>12 information is probably from the Java site. But I</p> <p>13 used an R script for that. But there is a similar</p> <p>14 Android stability analysis file, as well. I would</p> <p>15 need to look at where exactly, but I think I</p> <p>16 provided it.</p> <p>17 Q You don't see it here in this folder, do</p> <p>18 you?</p> <p>19 A So it could be in the stability</p> <p>20 analysis_1 through 23. It could be in there.</p> <p>21 Q What is instability analysis 13-14?</p> <p>22 A So I think that it contains maybe the PHP</p> <p>23 script or the R script once more. And maybe a read</p> <p>24 me file sort of giving the instruction on why I put</p> <p>25 that in. What happens in -- that's probably what's</p>	<p style="text-align: right;">Page 137</p> <p>1 also information on, I think, the CSV output from</p> <p>2 this tool that I used, Understand, for Java and for</p> <p>3 Android. And I can't recall what's under the zips,</p> <p>4 probably zipped of these versions or something.</p> <p>5 Q So what are these files, sir?</p> <p>6 MR. RAMSEY: Objection to form.</p> <p>7 THE WITNESS: These are the -- some of</p> <p>8 the -- this is the files I used to invoke</p> <p>9 Understand for collecting the page ranks course</p> <p>10 for -- sorry, I misspoke. For the dependency</p> <p>11 portion of that particular analysis that</p> <p>12 Dr. Kemerer was running.</p> <p>13 BY MR. PAIGE:</p> <p>14 Q So these files were used with Understand</p> <p>15 to get out the data you wanted from Understand; is</p> <p>16 that right?</p> <p>17 A Yeah. So these are the files I was</p> <p>18 describing before, which is they come primarily</p> <p>19 from the documentation -- from Understand's</p> <p>20 documentation.</p> <p>21 And I wrote it in a way which I just took</p> <p>22 most of the information from there and put it in.</p> <p>23 There's multiple ways of doing it. You can use</p> <p>24 your -- it has a good user interface, as well.</p> <p>25 People can run it that way. I used this way to</p>

<p style="text-align: right;">Page 138</p> <p>1 access Understand. 2 Q Okay. There are other ways you could 3 have accessed Understand, right? 4 A That's right. 5 Q Okay. And generateDependency.SH. 6 What is that? 7 A That's what I call a shell script. 8 Q Okay. 9 A It's essentially like if you think 10 about -- if you have a terminal, and you're trying 11 to write -- you're trying to find out what the 12 file -- number of files are, what the files are in 13 that particular folder, you write a set of 14 commands. 15 This is a wrapper script that I wrote 16 just for convenience so that I don't have to 17 manually repeat some of the processes that I was 18 asked to do. 19 Q And was that an input to Understand, as 20 well? 21 A These are, like I said, shell scripts. 22 So they might have information that I sent to the 23 Understand tool -- 24 Q Yeah. 25 A -- to run it.</p>	<p style="text-align: right;">Page 140</p> <p>1 those things which came from Understand. 2 Q Okay. 3 MR. PAIGE: We'll go onto Exhibit 1603, 4 please. 5 (Deposition Exhibit 1603 was marked for 6 identification by the court reporter.) 7 BY MR. PAIGE: 8 Q Mr. Chatterjee, I've put in front of you 9 Exhibit 1603. It is the contents of 13 PageRank 10 NetworkX Android. 11 And could you tell me what the files in 12 there are, please, sir? 13 A These are the files that I believe are 14 inputs and -- inputs into the NetworkX tool that I 15 used to calculate page rank scores for Android. 16 (Reporter clarification.) 17 BY MR. PAIGE: 18 Q And what are the files that end with 19 .JSON? 20 A That's just -- JSON is the data format. 21 It's -- it's -- it's an intermediary output which 22 forms the input for running the NetworkX tool. 23 Q And how do you generate the JSON output? 24 A I believe it's the DGraph.py, the Python 25 script that generates the JSON file.</p>
<p style="text-align: right;">Page 139</p> <p>1 So I mean, in that sense, it contains 2 some information that I provided to Understand. 3 Q Okay. And you wrote it yourself, right? 4 A These ones, yes. 5 Q Yeah. And what language is the SH file 6 in? 7 A It's a shell script. So I mean, it's 8 a -- I guess it's a -- I'm not sure what language 9 you would call them -- call it. But it's 10 essentially what happens in the back-end when you 11 double click a folder or something like that. So 12 just a command line input. 13 Q Okay. And I see five files with the 14 extension PY. 15 Those are written in Python, right? 16 A That's right. 17 Q What about the generateUdb that doesn't 18 have an extension on it? What is that? 19 A GenerateUdb -- so one of the steps that 20 you have to -- I have to do is I need to generate 21 the Understand -- Udb stands for Understand 22 database. So this particular file actually does 23 help with that. 24 I don't know if I actually wrote this 25 particular file, honestly. This could be one of</p>	<p style="text-align: right;">Page 141</p> <p>1 Q Okay. And who wrote the DGraph.py file? 2 A I wrote I think most part of this one. 3 But this could be one of those ones where -- like 4 JSON is another format which is very popular 5 around. So I might have taken some portion from 6 either NetworkX or one of the tools. 7 Q What about core S.py? Did you write 8 that, as well? 9 A Core underscore, yes . PY is a Python 10 script that I wrote to run NetworkX. It's, again, 11 one of those things that NetworkX documentation 12 might be the primary driver of what I wrote in 13 there. 14 Q And those are inputs to NetworkX, right? 15 The two PY files, Python files? 16 A That's the actual way to invoke NetworkX, 17 core_s.py is a way. DGraph.py is a script that 18 would generate the JSON file. 19 Q Just so I understand. The PYs are the 20 inputs, and the JSONs are the outputs from 21 NetworkX? 22 A PY is the tool. You can think of it as a 23 tool. 24 Q Okay. 25 A And JSON is the output.</p>

<p style="text-align: right;">Page 154</p> <p>1 comfortable using that.</p> <p>2 Q Okay. I'm sorry, I thought you had said</p> <p>3 that he picked the schema. And now it sounds like</p> <p>4 you're saying you showed him the schema you had</p> <p>5 chose, and he was comfortable with it.</p> <p>6 So could you please explain further?</p> <p>7 A I didn't make the final choice. What I</p> <p>8 did was I've used Understand in the past.</p> <p>9 Q Uh-huh.</p> <p>10 A So he asked me, what's the -- go and find</p> <p>11 me the schema that Understand provides. I want to</p> <p>12 take a look. I showed it to him. And he decided</p> <p>13 that he wanted me to use that for the purposes of</p> <p>14 the dependency calculation.</p> <p>15 Q When you say that, what do you mean? How</p> <p>16 is the schema being used?</p> <p>17 A It's sort of an input to the Understand</p> <p>18 tool. So we didn't change -- I didn't change any</p> <p>19 of the settings anyway, just used the default</p> <p>20 schema that's used.</p> <p>21 Q And what does the default schema do?</p> <p>22 A It sort of provides the -- sort of the</p> <p>23 types of dependencies it tries to capture.</p> <p>24 Q And what specific dependencies does it</p> <p>25 use?</p>	<p style="text-align: right;">Page 156</p> <p>1 THE WITNESS: I won't characterize it</p> <p>2 exactly that way. He asked me like what's the --</p> <p>3 what does Understand exactly capture, I want to</p> <p>4 know. I gave him the schema. And he -- and I</p> <p>5 asked him, you tell me what you want to pick out of</p> <p>6 this choice.</p> <p>7 And he decided. He said, Let's go with</p> <p>8 the schema that Understand provides.</p> <p>9 BY MR. PAIGE:</p> <p>10 Q When you say you gave him the schema,</p> <p>11 what do you mean by that?</p> <p>12 A I showed it to him when I was with him.</p> <p>13 And so he asked me, Can I see the schema? So I</p> <p>14 opened it and showed it to him.</p> <p>15 Q So did he read the Python script?</p> <p>16 A He could have read it. I wasn't like</p> <p>17 part of that process of him reading it.</p> <p>18 But I -- I mean, I showed it to him when</p> <p>19 I was there. And he took a look at it when I was</p> <p>20 there.</p> <p>21 He told me a couple of days later he was</p> <p>22 fine using that.</p> <p>23 Q Okay. And did you explain to him what is</p> <p>24 in the schema, or did he just look at the Python</p> <p>25 file?</p>
<p style="text-align: right;">Page 155</p> <p>1 MR. RAMSEY: Objection. Form.</p> <p>2 THE WITNESS: It uses, again, inheritance</p> <p>3 method, caused, method declarations, things like</p> <p>4 that. So I would need to look at the schema</p> <p>5 specifically, but it's all the regular, like,</p> <p>6 relationship maps between method, classes, things</p> <p>7 like that.</p> <p>8 BY MR. PAIGE:</p> <p>9 Q Did you provide the schema in the</p> <p>10 documents you've sent over the past week?</p> <p>11 A I think I did.</p> <p>12 Q Where is that found?</p> <p>13 A I probably need to look at it.</p> <p>14 Q Sure.</p> <p>15 A I can't tell which folder it is, but</p> <p>16 you've got the Udb chema Java.py. That's the</p> <p>17 schema.</p> <p>18 Q That's the schema you used?</p> <p>19 A That's right.</p> <p>20 Q Okay. And just so I understand, you</p> <p>21 said, Dr. Kemerer, here is the default schema. Is</p> <p>22 this okay with you? And he said, Yes, it seems</p> <p>23 fine to me.</p> <p>24 Is that how it went down?</p> <p>25 MR. RAMSEY: Objection. Form.</p>	<p style="text-align: right;">Page 157</p> <p>1 A He took a look at it. He's done</p> <p>2 object-oriented programming in the past. So he</p> <p>3 understands the method class package relationships.</p> <p>4 And that's to the extent which I talked about with</p> <p>5 him.</p> <p>6 Q Okay. So you didn't explain what was in</p> <p>7 the schema, you just gave him the file; is that</p> <p>8 right?</p> <p>9 A No. He asked me, Can you open the file</p> <p>10 on my computer?</p> <p>11 Q Uh-huh.</p> <p>12 A Talked about what these are. I pointed</p> <p>13 him to the documentation because that has most --</p> <p>14 it has almost all the information that you need.</p> <p>15 Q Uh-huh.</p> <p>16 A And he -- and then he asked me a few</p> <p>17 questions along what this is, what that is. I</p> <p>18 can't remember specific questions.</p> <p>19 And then he -- and then a couple of days</p> <p>20 later, he asked me, Okay, let's use the Understand</p> <p>21 schema that you showed me.</p> <p>22 Q What questions did he ask you and what</p> <p>23 information did you give him in return?</p> <p>24 A Like I said, I don't know specific</p> <p>25 portions of that particular script. He asked me if</p>

<p style="text-align: right;">Page 158</p> <p>1 there were -- if I had changed any of the -- for 2 example, if I had changed any of the Python script 3 in any way before I downloaded from -- after I 4 downloaded from Understand. My response was no. 5 Q And what options did you offer him in 6 terms of the schema? 7 A The schema itself is something that can 8 be changed. So there are a number of options in 9 there. 10 And so the choices would be -- as long as 11 you're using the Understand tool, those are the 12 choices that someone could make. 13 Q Right. And what choices are those? 14 A Again, those are types of dependencies, 15 method dependencies, class dependencies, things 16 like that. 17 Q And what did you explain to him about the 18 possible changes he could make? 19 A I could -- I pointed him to what's the -- 20 where the dependencies are listed and told him 21 these are the things that Understand captures. 22 Like I said, he understands 23 object-oriented programming in general. So he was 24 able to tell me about what I wanted to -- I mean, 25 at that time, he asked me the questions and then</p>	<p style="text-align: right;">Page 160</p> <p>1 Essentially, what we did, I collected 2 these source code information from -- so there were 3 two parts to it, one on the Java side and the other 4 on the Android side. 5 (Reporter clarification.) 6 THE WITNESS: We described the Android 7 side, a little more complicated. 8 So API levels 1 to 13 were in a certain 9 format, in the XML format. API levels 14 to 23 10 were in a different format, TXT format, file 11 format. So I used two different sort of scripts to 12 gather the data there. 13 On the XML side, I used -- the first step 14 was sort of converting the XML to a CSV, comma 15 separated value format. The CSV file was then -- 16 so there were a number of files that were generated 17 there for each API level. 18 BY MR. PAIGE: 19 Q Uh-huh. 20 A I then had to combine them to make sure I 21 captured the information on the methods together in 22 the CSV format. 23 On the Android side -- sorry, on the 14 24 to 23 API levels, I used the PHP parser that I 25 talked about in the past and got the -- as an</p>
<p style="text-align: right;">Page 159</p> <p>1 came back to me saying that he was fine using that. 2 Q And you don't recall the questions he 3 asked you at all? 4 A Because, like I said, one of the 5 questions he asked me was whether I actually made 6 any changes to the schema that I downloaded from 7 Understand. 8 Q And what other questions did he ask you? 9 A It's a long time back. I can't recall 10 specific questions. 11 MR. PAIGE: Okay. Let's take a lunch 12 break. 13 THE VIDEOGRAPHER: Going off the record. 14 The time is 12:46. 15 (Lunch break taken.) 16 THE VIDEOGRAPHER: Back on the record. 17 The time is 1:32. 18 MR. PAIGE: Mr. Chatterjee, can you 19 please describe how you conducted the stability 20 analysis that you did. 21 MR. RAMSEY: Objection. Form. 22 THE WITNESS: I provided the data for 23 that particular analysis that Dr. Kemerer 24 performed. And it was a lot of steps. Let me just 25 explain.</p>	<p style="text-align: right;">Page 161</p> <p>1 output, I got a CSV file again capturing similar 2 kind of method information for the TXT side of 3 those files. 4 So I now had two different data sources. 5 I put them together so I could work off of a single 6 file. And then -- so that sort of forms the input 7 to the R script that I used then to capture the 8 number of changes between the different API levels 9 for the methods that Dr. Kemerer asked me to -- 10 like the structure that he had asked me to use. 11 So I captured the changes between the API 12 levels. And that provided the -- that gave the 13 output for the -- the CSV output that then I was -- 14 I gave to Dr. Kemerer. That's on the stability for 15 Android. 16 Do you want me to describe the Java side, 17 as well? 18 Q Sure. 19 A On the Java side, again, at a high level, 20 converted the source code into HTML format using 21 the Javadoc tool. Then used the parser to get the 22 CSV format from there, and then the CSV was fed 23 into the -- into an R script that generated the -- 24 again, the same similar kind of changes that I 25 described to you on the Android side.</p>

<p style="text-align: right;">Page 162</p> <p>1 Q So you used Javadoc to get the material</p> <p>2 that you used for your stability analysis on the</p> <p>3 Java side, right?</p> <p>4 A That's correct.</p> <p>5 Q And what is Javadoc?</p> <p>6 A It's a tool that is provided by Oracle.</p> <p>7 It's provided by Oracle.</p> <p>8 Q Right. And what does it do?</p> <p>9 A Oh, it just converts -- it creates</p> <p>10 documentation from the source code.</p> <p>11 Q So you run the Javadoc on the source</p> <p>12 code, and it gives you documentation out?</p> <p>13 A That's right.</p> <p>14 Q Can you run Javadoc on Android source</p> <p>15 code?</p> <p>16 A I don't know. I haven't tried that.</p> <p>17 Q Did you think it might have been a good</p> <p>18 idea to try running Javadoc on the Android source</p> <p>19 code so you would have the same sort of input</p> <p>20 coming from both Java and Android?</p> <p>21 MR. RAMSEY: Objection. Form.</p> <p>22 THE WITNESS: No. The reason being the</p> <p>23 file formats are different. So I used a different</p> <p>24 approach.</p> <p>25</p>	<p style="text-align: right;">Page 164</p> <p>1 A I did not investigate specifically, no.</p> <p>2 Q Did you not think it would be a good idea</p> <p>3 to do apples to apples and use Javadoc on both Java</p> <p>4 and Android?</p> <p>5 A Like I said, I mean, the starting point</p> <p>6 were XML files, TXT files, so I had to use a</p> <p>7 different approach.</p> <p>8 Q Sorry, Mr. Chatterjee. I thought you had</p> <p>9 agreed with me that all of the Android source code</p> <p>10 is publicly available as .Java files, isn't it?</p> <p>11 MR. RAMSEY: Objection. Form.</p> <p>12 THE WITNESS: The source code is</p> <p>13 available publicly, yes.</p> <p>14 BY MR. PAIGE:</p> <p>15 Q In the form of .Java files, correct?</p> <p>16 A I don't know if they're .Java files.</p> <p>17 There could be other file formats, as well.</p> <p>18 Q You don't know what the source code</p> <p>19 format is for Android files?</p> <p>20 A Like I said, there could be other file</p> <p>21 formats. .C, .header files. So there could be</p> <p>22 other file formats, as well.</p> <p>23 Q Well, for .C or .header file, those</p> <p>24 aren't involved in your stability analysis anyway,</p> <p>25 are they?</p>
<p style="text-align: right;">Page 163</p> <p>1 BY MR. PAIGE:</p> <p>2 Q What do you mean the file formats are</p> <p>3 different?</p> <p>4 A So like I said, it's the CSV file</p> <p>5 format -- sorry, the XML file format on the Android</p> <p>6 side, TXT file format. And on the Java side, the</p> <p>7 source code essentially, yeah.</p> <p>8 Q On the Java side, they're .class files?</p> <p>9 Is that what you're saying?</p> <p>10 A .Java files for the class files, yeah.</p> <p>11 Q .Java files?</p> <p>12 But all of the Android source code is</p> <p>13 publicly available as .Java files, as well, is it</p> <p>14 not?</p> <p>15 A Yes, you could download that, as well, I</p> <p>16 believe.</p> <p>17 Q So you could have downloaded all of the</p> <p>18 Android source code as .Java files and run Javadoc</p> <p>19 on it, right?</p> <p>20 (Reporter clarification.)</p> <p>21 THE WITNESS: I don't know. I haven't</p> <p>22 done that. But it could be possible.</p> <p>23 BY MR. PAIGE:</p> <p>24 Q Did you investigate whether you could do</p> <p>25 it?</p>	<p style="text-align: right;">Page 165</p> <p>1 A No, I don't believe so.</p> <p>2 Q Okay. So all the .Java files that are</p> <p>3 involved in your stability analysis, those are all</p> <p>4 publicly available on the Android website, are they</p> <p>5 not?</p> <p>6 A It's a -- on the Android website, it's</p> <p>7 available in a Google Git repository.</p> <p>8 Q So all of the Java files that you need to</p> <p>9 perform your analysis are available on the Google</p> <p>10 Git repository, correct?</p> <p>11 A It's not in my analysis. Again, in terms</p> <p>12 of just -- in terms of the data, I was asked to --</p> <p>13 Dr. Kemerer to look at the XML and the TXT files,</p> <p>14 and so that's how I used that.</p> <p>15 Q Ah. So Dr. Kemerer actually specifically</p> <p>16 asked you to look at the TXT and XML files rather</p> <p>17 than looking at the Java source code?</p> <p>18 A No. He asked me to look at the Java</p> <p>19 source code, as well, for the Java side of the</p> <p>20 stability analysis.</p> <p>21 Q For the what?</p> <p>22 A For the Java side of the stability</p> <p>23 analysis.</p> <p>24 Q On the Android side, Dr. Kemerer</p> <p>25 specifically asked you to look at the XML and TXT</p>

<p style="text-align: right;">Page 182</p> <p>1 MR. RAMSEY: Objection. Form.</p> <p>2 THE WITNESS: It's again his analysis.</p> <p>3 I'm trying to think if -- change is important.</p> <p>4 I mean, I don't know what important</p> <p>5 exactly means.</p> <p>6 BY MR. PAIGE:</p> <p>7 Q So any change counts as a change,</p> <p>8 regardless of whether it, say, causes problems with</p> <p>9 compatibility, right?</p> <p>10 MR. RAMSEY: Objection. Form.</p> <p>11 THE WITNESS: Again, you're telling me</p> <p>12 about problems to compatibility that I don't know</p> <p>13 about that part of it.</p> <p>14 But any change in the declaring code</p> <p>15 would be captured as one change.</p> <p>16 BY MR. PAIGE:</p> <p>17 Q Regardless of whether it caused any</p> <p>18 problems for developers, right?</p> <p>19 MR. RAMSEY: Objection. Form.</p> <p>20 THE WITNESS: Typically, when -- again,</p> <p>21 this is my -- from what I know or what I've done in</p> <p>22 the past, like I described before.</p> <p>23 Typically, any -- any one of those</p> <p>24 changes, if you -- if it changes, then the method</p> <p>25 declaration changes, and I need to look it up on</p>	<p style="text-align: right;">Page 184</p> <p>1 Again, I don't know for a fact. It's a</p> <p>2 pure sort of speculation.</p> <p>3 BY MR. PAIGE:</p> <p>4 Q Have you done any investigation to</p> <p>5 determine whether all of the changes measured by</p> <p>6 the methodology would cause problems with backwards</p> <p>7 compatibility?</p> <p>8 MR. RAMSEY: Objection. Form.</p> <p>9 THE WITNESS: Like I said, I've not spent</p> <p>10 much time thinking about backward compatibility.</p> <p>11 Again, it's not my analysis, so I don't know that.</p> <p>12 However, any change to the declaring</p> <p>13 code, in my opinion, has some effect on the</p> <p>14 backward compatibility, as well. And that's just</p> <p>15 based on things I've read.</p> <p>16 MR. PAIGE: Okay. Well, move to strike</p> <p>17 that as nonresponsive and ask again.</p> <p>18 BY MR. PAIGE:</p> <p>19 Q Have you done any investigation to</p> <p>20 determine whether the changes measured by the</p> <p>21 methodology would cause problems with backwards</p> <p>22 compatibility?</p> <p>23 A To the extent that the changes are</p> <p>24 captured -- again, like I said, backward</p> <p>25 compatibility is something that's not something</p>
<p style="text-align: right;">Page 183</p> <p>1 either the documentation or somewhere else to make</p> <p>2 sure I can -- I'm able to write that particular</p> <p>3 method declaration. So it could potentially cause</p> <p>4 problems to me.</p> <p>5 BY MR. PAIGE:</p> <p>6 Q But it doesn't have to cause problems to</p> <p>7 you, correct?</p> <p>8 MR. RAMSEY: Objection. Form.</p> <p>9 THE WITNESS: Personally speaking, it</p> <p>10 does cause problems.</p> <p>11 BY MR. PAIGE:</p> <p>12 Q Have you done any investigation to see</p> <p>13 whether any of the changes you've measured actually</p> <p>14 cause an app to no longer work on the new API</p> <p>15 level?</p> <p>16 MR. RAMSEY: Objection. Form.</p> <p>17 THE WITNESS: The changes that I was</p> <p>18 asked to capture, I would -- I haven't done that</p> <p>19 analysis explicitly because I was not asked to do</p> <p>20 that.</p> <p>21 But from the -- on the information that</p> <p>22 was collected, I would guess that it would have an</p> <p>23 impact on -- any change would have an impact on the</p> <p>24 functionality of the particular app. Or if the app</p> <p>25 would work or not.</p>	<p style="text-align: right;">Page 185</p> <p>1 that I've done specifically. Or I know what the</p> <p>2 formal definition is.</p> <p>3 As a result, I cannot tell for a fact</p> <p>4 whether -- I can't be definite about the fact that</p> <p>5 if any of these changes would be reflected or be --</p> <p>6 have an impact on the backward compatibility that</p> <p>7 you're talking about.</p> <p>8 Q Okay. So you haven't done any</p> <p>9 investigation of whether they would have any impact</p> <p>10 on backward compatibility, right?</p> <p>11 MR. RAMSEY: Objection. Form.</p> <p>12 THE WITNESS: I read a paper, which</p> <p>13 Dr. Kemerer pointed me to, which talked about</p> <p>14 backward compatibility. That paper talked about</p> <p>15 this particular -- the change metric that he was</p> <p>16 suggesting.</p> <p>17 And so to the extent that that paper</p> <p>18 covers the backward compatibility and the changes</p> <p>19 metric together, I would say that I've done some --</p> <p>20 I've collected the data that can inform that</p> <p>21 particular work.</p> <p>22 But again, I don't know specifically</p> <p>23 about backward compatibility because I didn't think</p> <p>24 about it very carefully on -- I was not asked to do</p> <p>25 it.</p>

<p style="text-align: right;">Page 206</p> <p>1 instability or not, right?</p> <p>2 A I haven't spent time thinking about it,</p> <p>3 honestly, so I don't have one way or the other --</p> <p>4 opinion one way or the other.</p> <p>5 Q Okay. So as far as you're concerned, if</p> <p>6 it has more cumulative number of changes per</p> <p>7 package, that may or may not reflect instability;</p> <p>8 is that right?</p> <p>9 MR. RAMSEY: Objection. Form.</p> <p>10 THE WITNESS: Yeah. I don't know one way</p> <p>11 or the other because I've not really thought about</p> <p>12 it in this particular context, so I just don't</p> <p>13 know.</p> <p>14 BY MR. PAIGE:</p> <p>15 Q Did you do Figures 8 or 9?</p> <p>16 MR. RAMSEY: Objection. Form.</p> <p>17 THE WITNESS: I might have plotted it. I</p> <p>18 can't remember -- I mean, it says Google source. I</p> <p>19 don't know -- I don't remember, I mean, one way or</p> <p>20 the other if I actually looked at this particular</p> <p>21 one or not. But I helped Dr. Kemerer plot this</p> <p>22 particular graph, I would say.</p> <p>23 BY MR. PAIGE:</p> <p>24 Q Okay. Can you turn to page 64, please.</p> <p>25 A 64. I'm there.</p>	<p style="text-align: right;">Page 208</p> <p>1 A Yes, thank you.</p> <p>2 Yes. It appears to be the R scripts.</p> <p>3 Q Okay. So those are the only scripts I</p> <p>4 see in the table of appendices. I'm looking on</p> <p>5 page 64.</p> <p>6 Do you see any other scripts that were</p> <p>7 attached to Dr. Kemerer's report here?</p> <p>8 A I don't see -- yeah, I don't see any</p> <p>9 scripts attached -- I mean --</p> <p>10 Q Okay.</p> <p>11 A -- listed here.</p> <p>12 Q So where are the Python scripts that</p> <p>13 Dr. Kemerer used in this report?</p> <p>14 A The Python scripts, like I said, it's --</p> <p>15 essentially something they had me collect the data</p> <p>16 in a way which is -- just avoids repetition. And</p> <p>17 so anyone can do it in any different way. So I</p> <p>18 didn't provide that.</p> <p>19 Q You didn't provide that?</p> <p>20 A I mean, Dr. Kemerer, it appears, didn't</p> <p>21 provide it here.</p> <p>22 Q Okay. Let me ask you a little bit about</p> <p>23 what I'll mark as Exhibit 1613.</p> <p>24 (Deposition Exhibit 1613 was marked for</p> <p>25 identification by the court reporter.)</p>
<p style="text-align: right;">Page 207</p> <p>1 Q Okay. You see Appendix F listed there?</p> <p>2 A Yes, I see that.</p> <p>3 Q Okay. And that's a PHP parser script for</p> <p>4 Java.HTML documentation?</p> <p>5 A Yeah, it has those words, yes.</p> <p>6 Q And that's the parser script we talked</p> <p>7 about earlier today?</p> <p>8 A Can I take a look at it?</p> <p>9 Q Sure. Please, by all means. Page 110 is</p> <p>10 where it starts, I believe.</p> <p>11 A I see. Yeah.</p> <p>12 Yes, it appears to be the PHP parser</p> <p>13 script.</p> <p>14 Q Okay. And then Appendix I, you see that?</p> <p>15 If you want to look at the appendix itself, it's</p> <p>16 page 161.</p> <p>17 A Page 161?</p> <p>18 Q Yeah.</p> <p>19 A Thank you.</p> <p>20 Yes, it appears to be the PHP script,</p> <p>21 again I think we talked about earlier today.</p> <p>22 Q Okay. For Android, right?</p> <p>23 A For 14 to 23 API levels, yes. Android.</p> <p>24 Q Okay. And then let's look at Appendix Q,</p> <p>25 please. It's page 230, if that's helpful.</p>	<p style="text-align: right;">Page 209</p> <p>1 BY MR. PAIGE:</p> <p>2 Q Let me have you turn to page 28, if I</p> <p>3 could.</p> <p>4 A I'm there.</p> <p>5 Q Okay. And you see where it starts with</p> <p>6 the red text giving a bunch of names, java.applet,</p> <p>7 java.awt, so on and so forth?</p> <p>8 A I do see that, yeah.</p> <p>9 Q And do you see where it continues on to</p> <p>10 page 32 at line 265?</p> <p>11 A Yes, I see that.</p> <p>12 Q Okay. So by my math, that's about 248</p> <p>13 things, entries, lines, whatever you want to call</p> <p>14 them.</p> <p>15 Is that fair?</p> <p>16 A Yeah, approximately, yeah.</p> <p>17 Q Okay. What are those 248 entries?</p> <p>18 MR. RAMSEY: Objection. Form.</p> <p>19 THE WITNESS: These are the list of</p> <p>20 packages that appear if you download the JDK from</p> <p>21 the Oracle website.</p> <p>22 BY MR. PAIGE:</p> <p>23 Q There's 248 of them?</p> <p>24 A The ones that you download from the</p> <p>25 Oracle website, yeah.</p>

<p style="text-align: right;">Page 210</p> <p>1 Q How do you get 248, Mr. Chatterjee?</p> <p>2 MR. RAMSEY: Objection. Form.</p> <p>3 THE WITNESS: That's what you get when</p> <p>4 you download it from the Oracle website.</p> <p>5 BY MR. PAIGE:</p> <p>6 Q Are there 248 APIs in Java SE?</p> <p>7 A These are the packages that are -- that</p> <p>8 you get when you download the JDK.</p> <p>9 Q So it's your testimony there are 248 API</p> <p>10 packages in Java SE?</p> <p>11 A I don't know the exact numbers, but these</p> <p>12 are the ones that I got when I downloaded it from</p> <p>13 the Oracle website.</p> <p>14 Q Would you turn to page 159 of</p> <p>15 Exhibit 1612, please, sir.</p> <p>16 A I'm there.</p> <p>17 Q Okay. Do you see where Dr. Kemerer's</p> <p>18 report totals up the total number of APIs in each</p> <p>19 version of Java SE down at the bottom where it says</p> <p>20 total?</p> <p>21 A I see that.</p> <p>22 Q Okay. How many APIs does Java SE have,</p> <p>23 at most, according to Dr. Kemerer?</p> <p>24 A I can't tell from here. I need to look</p> <p>25 at the data. Because it depends on the maximum</p>	<p style="text-align: right;">Page 212</p> <p>1 A So it appears that this is coming from</p> <p>2 there. And the other file that we just talked</p> <p>3 about is from the source code, the JDK.</p> <p>4 Q So there are things in the R script here</p> <p>5 in Appendix C that are not in the documentation for</p> <p>6 Java SE? Is that what you're saying?</p> <p>7 A There could be. I mean, there are, like,</p> <p>8 for example -- there are support files, sometimes</p> <p>9 people put in -- I don't know. I have to do that</p> <p>10 comparative analysis, but there could be, yes.</p> <p>11 Q Could be, but you don't know one way or</p> <p>12 another?</p> <p>13 A I couldn't tell one way or the other for</p> <p>14 sure.</p> <p>15 Q So who decided to take these particular</p> <p>16 248 APIs?</p> <p>17 A It comes from the JDKs that you download</p> <p>18 from the Oracle website. And so Professor Kemerer</p> <p>19 told me to do that, and so it comes from there. So</p> <p>20 he decided.</p> <p>21 Q Okay. Who made the decision to use all</p> <p>22 248 in this script?</p> <p>23 A He made the decision. I mean, he said</p> <p>24 capture all the packages that are coming from the</p> <p>25 JDK.</p>
<p style="text-align: right;">Page 211</p> <p>1 numbers across this -- I mean, it could be like</p> <p>2 some APIs were removed from one portion and added</p> <p>3 on another one. So you need to take a look at the</p> <p>4 total number.</p> <p>5 Q Well, Dr. Kemerer seems to have a listing</p> <p>6 of all the APIs from versions 1 through 8. And it</p> <p>7 looks like they weren't really removed, right?</p> <p>8 A I can't tell -- I did do the analysis,</p> <p>9 but I think one thing that might be helpful to know</p> <p>10 is that this is from the documentation. This comes</p> <p>11 from the documentation, I guess, from the online</p> <p>12 documentation. And the JDK might have more</p> <p>13 packages.</p> <p>14 Q Appendix G comes from the online</p> <p>15 documentation?</p> <p>16 A I think so.</p> <p>17 Q Did you prepare Appendix G yourself,</p> <p>18 Mr. Chatterjee?</p> <p>19 A I put it together, but it looks like</p> <p>20 that. Just based on the -- I have a Java SE 1.5</p> <p>21 being 166, that number there, at the end, that</p> <p>22 appears to be the number that's usually listed in</p> <p>23 the -- if you count the number of packages in the</p> <p>24 API documentation.</p> <p>25 Q Uh-huh.</p>	<p style="text-align: right;">Page 213</p> <p>1 Q He told you use all 248 in the JDK, that</p> <p>2 was his specific words to you?</p> <p>3 A Specific words, I can't remember. But he</p> <p>4 said use the packages that are coming from the JDK,</p> <p>5 and I did that.</p> <p>6 Q Okay. So your testimony is Dr. Kemerer</p> <p>7 told you, take all the packages from the JDK, and</p> <p>8 that ended up being 248, right?</p> <p>9 A From the publicly-available -- yeah --</p> <p>10 source code.</p> <p>11 Q And you recall this -- that it's from the</p> <p>12 JDK how?</p> <p>13 A I mean, it's from the -- that particular</p> <p>14 data collection effort started with the source</p> <p>15 code, so it comes from that.</p> <p>16 Q But do you know that, or are you just</p> <p>17 kind of reconstructing?</p> <p>18 MR. RAMSEY: Objection. Form.</p> <p>19 THE WITNESS: I'm pretty confident about</p> <p>20 it.</p> <p>21 BY MR. PAIGE:</p> <p>22 Q Pretty confident?</p> <p>23 A Yes.</p> <p>24 Q Why are you pretty confident?</p> <p>25 A Because this comes from the source code.</p>

<p style="text-align: right;">Page 226</p> <p>1 using the Java files instead of the TXT and XML 2 files, right?</p> <p>3 A I didn't make that choice. I just 4 pointed him towards what I found.</p> <p>5 Q Sorry. That wasn't my question. My 6 question was: You don't know one way or another 7 whether you gave Dr. Kemerer the option of using 8 the Java files instead of the TXT and XML files, 9 right?</p> <p>10 MR. RAMSEY: Object to form.</p> <p>11 THE WITNESS: What was the last part of 12 the question? If you could read that.</p> <p>13 MR. PAIGE: Go ahead.</p> <p>14 (Record read as follows: "My question 15 was: You don't know one way or another 16 whether you gave Dr. Kemerer the option 17 of using the Java files instead of the 18 TXT and XML files, right?")</p> <p>19 THE WITNESS: In Android, again, I looked 20 at the source code, and I gave him the option -- I 21 mean, I didn't -- like I said, current.txt, 22 current.xml are files that I found in the source 23 code. He pointed me to the source code. So I gave 24 him that as the option to consider, and he made the 25 choice.</p>	<p style="text-align: right;">Page 228</p> <p>1 it could take various inputs, but the source code 2 files are fed into the Understand tool. What it 3 does is it captures dependencies and provides 4 dependencies outputs.</p> <p>5 BY MR. PAIGE:</p> <p>6 Q How does it capture dependencies?</p> <p>7 MR. RAMSEY: Objection. Form.</p> <p>8 THE WITNESS: It's essentially -- think 9 of it as like an accounting exercise. It looks for 10 certain key words and sort of the relationships 11 between the classes and the methods. And based on 12 that information, it -- it produces -- it counts 13 the number of dependencies, number of times this 14 has been extended. Some of the times, this has 15 been -- the class files have been inherited, things 16 like that. So it does that.</p> <p>17 BY MR. PAIGE:</p> <p>18 Q And are those dependencies found in the 19 implementing code of the software?</p> <p>20 A Anything that would involve the method 21 declaration. So, ultimately, everything is the 22 method declaration. And yes, I mean, I didn't look 23 at the implementing code specifically. I don't 24 think so. So I just looked at the declaring code 25 that Professor Kemerer asked me, but I don't know</p>
<p style="text-align: right;">Page 227</p> <p>1 BY MR. PAIGE:</p> <p>2 Q Did you give him a second option to 3 consider, as well?</p> <p>4 A I can't recall one way or the other if I 5 talked about the source code, the Java source code 6 having the .Java files in the Android. I can't 7 remember that.</p> <p>8 Q Okay. So you don't know whether you gave 9 him that option?</p> <p>10 A I can't remember that right now.</p> <p>11 Q Okay. How many times had you used 12 Understand before this case?</p> <p>13 A Understand, probably seven times. At 14 least five, six times before.</p> <p>15 Q How many times had you used NetworkX 16 before this case?</p> <p>17 A NetworkX particularly, I don't believe 18 I've used NetworkX particularly before.</p> <p>19 Q So first time using it in this case?</p> <p>20 A Yes, in this particular matter.</p> <p>21 Q Could you describe how Understand works, 22 please?</p> <p>23 MR. RAMSEY: Objection. Form.</p> <p>24 THE WITNESS: Sure. So Understand is a 25 publicly-available tool. It essentially takes --</p>	<p style="text-align: right;">Page 229</p> <p>1 if Understand captured one way or another. I mean, 2 it could, but I just don't know here.</p> <p>3 Q What did you feed into Understand? What 4 was the input on the source code side?</p> <p>5 A It was the source code, like you 6 mentioned.</p> <p>7 Q Both the implementing and declaring code?</p> <p>8 A It's the source code. So yes, to the 9 extent that they have that information, yes. It's 10 the source code.</p> <p>11 Q Okay. So there are dependencies created 12 by implementing code, as well as by declaring code, 13 that are captured by Understand, right?</p> <p>14 MR. RAMSEY: Objection. Form.</p> <p>15 THE WITNESS: Ultimately, I mean, I was 16 addressing the declaring code, so what I captured 17 was the declaring code dependencies. Understand 18 can probably capture more than that.</p> <p>19 BY MR. PAIGE:</p> <p>20 Q So can Understand be -- can options be 21 used on Understand's settings to allow you to 22 capture just implementing code or just declaring 23 code dependencies?</p> <p>24 A Sure. I think it's possible to do that.</p> <p>25 Q Okay. And what setting did you use? Did</p>

<p style="text-align: right;">Page 238</p> <p>1 intended.</p> <p>2 You could have, if you so chose, have</p> <p>3 used Understand to look at not just the Java</p> <p>4 material in Android, but also the C plus plus and</p> <p>5 other code material in Android, the dependencies</p> <p>6 there; is that right?</p> <p>7 MR. RAMSEY: Objection. Form.</p> <p>8 THE WITNESS: I think Understand can do</p> <p>9 that. I personally haven't done that. It would</p> <p>10 require a lot more work to do that, I think.</p> <p>11 BY MR. PAIGE:</p> <p>12 Q Who chose to limit your running of</p> <p>13 Understand to only Java material in this analysis?</p> <p>14 A Dr. Kemerer asked me to only look at the</p> <p>15 Java files.</p> <p>16 Q Did you tell him, Dr. Kemerer, I can look</p> <p>17 at the other parts too, if you'd like?</p> <p>18 MR. RAMSEY: Objection. Form.</p> <p>19 THE WITNESS: I don't remember telling</p> <p>20 him one way or the other. If I told him about</p> <p>21 the -- I gave him the link to Understand, the site</p> <p>22 which contains the documentation. And he told me</p> <p>23 to use the Java files as an input for the</p> <p>24 Understand tool.</p> <p>25</p>	<p style="text-align: right;">Page 240</p> <p>1 BY MR. PAIGE:</p> <p>2 Q Do you know whether there's a Linux</p> <p>3 kernel in the Android platforms?</p> <p>4 A I know that exists in the Android</p> <p>5 platform. Yes, I do know that.</p> <p>6 Q Okay. But you don't have any idea of the</p> <p>7 relative number of lines of code -- of Java code</p> <p>8 versus other types of code in the Android platform,</p> <p>9 right?</p> <p>10 A I don't, no.</p> <p>11 Q So if you chose, you could have run an</p> <p>12 analysis that took into account dependencies beyond</p> <p>13 just Java classes for the Android platform, right?</p> <p>14 MR. RAMSEY: Object to form.</p> <p>15 THE WITNESS: And again, Dr. Kemerer</p> <p>16 chose. It's his analysis, and I wanted to just</p> <p>17 follow his instruction at this point.</p> <p>18 BY MR. PAIGE:</p> <p>19 Q If Dr. Kemerer had chosen, you could have</p> <p>20 run an analysis that took into account dependencies</p> <p>21 beyond just Java classes for the Android platform,</p> <p>22 right?</p> <p>23 MR. RAMSEY: Objection. Form.</p> <p>24 THE WITNESS: I would have looked into</p> <p>25 tools to do that. Understand would be one of the</p>
<p style="text-align: right;">Page 239</p> <p>1 BY MR. PAIGE:</p> <p>2 Q And before he told you to use the Java</p> <p>3 files, did you tell him, Dr. Kemerer, we can do</p> <p>4 more than just the Java files, if you so desire?</p> <p>5 MR. RAMSEY: Objection to form.</p> <p>6 THE WITNESS: I don't remember one way or</p> <p>7 the other telling him specifically that we could do</p> <p>8 more. I pointed him to what's the Understand</p> <p>9 website, SciTools website, and he made the choice</p> <p>10 of using the Java files for his analysis.</p> <p>11 BY MR. PAIGE:</p> <p>12 Q There's quite a bit of non-Java code in</p> <p>13 the Android platform, isn't there?</p> <p>14 MR. RAMSEY: Object to form.</p> <p>15 THE WITNESS: I don't know. I have to</p> <p>16 do -- I haven't done that analysis, so I don't</p> <p>17 know.</p> <p>18 BY MR. PAIGE:</p> <p>19 Q Do you know anything about what code is</p> <p>20 in the Android platform aside from Java code?</p> <p>21 MR. RAMSEY: Object to form.</p> <p>22 THE WITNESS: There could be C files, C</p> <p>23 plus plus header files. But I don't know to the</p> <p>24 extent how -- the relative sizes of any of those.</p> <p>25</p>	<p style="text-align: right;">Page 241</p> <p>1 tools I would consider, but I don't know because I</p> <p>2 haven't done that yet.</p> <p>3 BY MR. PAIGE:</p> <p>4 Q And all of the Java SE platform, that's</p> <p>5 all written in Java code, isn't it?</p> <p>6 MR. RAMSEY: Objection. Form.</p> <p>7 THE WITNESS: I haven't done that</p> <p>8 analysis. But there could be other files as well</p> <p>9 in there.</p> <p>10 BY MR. PAIGE:</p> <p>11 Q You don't know one way or another whether</p> <p>12 the Java SE platform is all written in Java code?</p> <p>13 A There could be C plus plus files in</p> <p>14 there, as well.</p> <p>15 Q Are there?</p> <p>16 A There could be. I haven't looked into</p> <p>17 those. But it's possible.</p> <p>18 Q You don't know one way or another?</p> <p>19 A I mean, I would be -- I would be a little</p> <p>20 surprised if it's not there. But I don't know. I</p> <p>21 haven't done that analysis.</p> <p>22 Q Okay. Now, you performed what you called</p> <p>23 a sensitivity analysis for Java.lang on the page</p> <p>24 rank analysis, right?</p> <p>25 A I did not perform the analysis; I, again,</p>

<p style="text-align: right;">Page 246</p> <p>1 THE VIDEOGRAPHER: This marks the end of 2 Volume I, Media Number 3 of the deposition of Rohit 3 Chatterjee. The time is 3:51 p.m. We're off the 4 record. 5 (Short break taken.) 6 THE VIDEOGRAPHER: We are back on the 7 record at 4:04 p.m. This marks the beginning of 8 Volume I, Media Number 4 of the deposition of Rohit 9 Chatterjee. Please continue. 10 MR. PAIGE: Mr. Chatterjee, welcome back. 11 You understand you're still under oath? 12 THE WITNESS: I do understand. 13 BY MR. PAIGE: 14 Q If you could take a look at Exhibit 1610, 15 please. It's the large 11-by-17 paper from your 16 raw data. 17 A 1610, yes. 18 Q Do you see where the second-to-last 19 column is the changes between API levels 21 and 22? 20 A Yes. I see that column. 21 Q And do you see the row for Android 22 hardware.camera2? 23 A Android hardware.camera2? 24 Q It's roughly 17 from the bottom. 25 A I see that.</p>	<p style="text-align: right;">Page 248</p> <p>1 And the files in the source code. 2 So I don't remember if I looked at this 3 particular -- this particular package in the 4 documentation specifically. 5 BY MR. PAIGE: 6 Q Did you look at any particular packages 7 in the documentation specifically to confirm 8 whether changes had or had not been made? 9 A Yeah. I definitely looked at the 10 documentation changes. Now, I can't remember. 11 There are so many packages here. I can't remember 12 exactly if I looked at one package versus the 13 other. 14 Q Well, what generally did you do to look 15 at the documentation to confirm the number of 16 changes? 17 A I went back to see the method 18 declarations between the different API levels, did 19 sort of -- like I said, this is -- a lot of it is 20 just an automated process. You can actually do -- 21 if you spend some time, you can actually do this 22 data collection by just looking at the different 23 API levels and the documentation for why -- some of 24 the information that I needed to do that. 25 But ultimately, like I said, I looked</p>
<p style="text-align: right;">Page 247</p> <p>1 Q Okay. And do you see where the data you 2 produced suggests that there are 179 changes in 3 Android.hardware.camera2 between API levels 21 and 4 22? 5 A Yes, I see that number. 6 Q Do you believe that number to be correct? 7 A Yes. To the extent this -- yes. This 8 is -- yeah, representing the same thing I saw on 9 the spreadsheet. This number should be correct. I 10 believe it's correct. 11 Q Now, are you aware that Android publishes 12 on its website the changes it makes to APIs? 13 MR. RAMSEY: Objection. Form. 14 THE WITNESS: I've seen reports that 15 probably do that. But not fully aware. 16 BY MR. PAIGE: 17 Q Well, did you look at the documentation 18 available on the Android website to see whether any 19 changes were made to Android.hardware.camera2? 20 MR. RAMSEY: Objection. Form. 21 THE WITNESS: I looked at the source code 22 for Android, right. So I didn't go back to the API 23 documentation to make sure -- so I went back to the 24 source code to make sure that the changes mapped 25 back into the source code.</p>	<p style="text-align: right;">Page 249</p> <p>1 back to the source code where I saw the changes 2 being mapped out, and that's what I captured. 3 Q When you say the source code, what file 4 specifically did you look at for API level 22? Was 5 that current.txt? 6 A Yeah, it's the current.txt, current.xml. 7 I also looked back at the -- I'm trying 8 to remember if I actually looked back at any other 9 things specifically. 10 But that was the source I started with. 11 And that's the -- that's a part of the source code. 12 Q Could you compile current.txt into an 13 executable file? 14 MR. RAMSEY: Objection. Form. 15 THE WITNESS: So current.txt and 16 current.xml, it's my understanding is that it -- it 17 is almost like a -- it's a signature test of some 18 sort when you build the Android operating system. 19 So essentially, the method declarations 20 that are present in current.txt and current.xml is 21 the one that's actually checked to make sure that 22 everything present in current.txt and current.xml 23 is matched with whatever you're trying to build in 24 Android. And so it's sort of a signature test to 25 do that.</p>

<p style="text-align: right;">Page 286</p> <p>1 APIs had changed?</p> <p>2 MR. RAMSEY: Objection. Form.</p> <p>3 THE WITNESS: I didn't decide to do the</p> <p>4 stability analysis, again, for this particular</p> <p>5 matter. I wasn't asked to do it, so I don't know.</p> <p>6 BY MR. PAIGE:</p> <p>7 Q When you were asked to play your role in</p> <p>8 the stability analysis, did you look for tools that</p> <p>9 would be capable of telling you whether APIs had</p> <p>10 changed?</p> <p>11 MR. RAMSEY: Objection. Form.</p> <p>12 THE WITNESS: I might have. But again,</p> <p>13 it really depends on the definition of the change</p> <p>14 which Dr. Kemerer defined. So based on what he</p> <p>15 said, I don't think I found any tool that could do</p> <p>16 it. I had to write a script to collect that data.</p> <p>17 BY MR. PAIGE:</p> <p>18 Q What do you mean by based on what he</p> <p>19 said, you don't think you found any tool that could</p> <p>20 do it?</p> <p>21 A So he had -- he wanted to measure the</p> <p>22 changes for the declaring code. He wanted to,</p> <p>23 like, capture certain parts of the declaring code,</p> <p>24 like I mentioned before.</p> <p>25 I personally have not come across -- I</p>	<p style="text-align: right;">Page 288</p> <p>1 not. I don't know.</p> <p>2 Q Did you look for tools that would do</p> <p>3 that?</p> <p>4 A So the -- I can't remember if I looked</p> <p>5 for it. But again, the work that I was asked to do</p> <p>6 is just literally collecting the data in a way --</p> <p>7 putting it in a format which is easy to -- I mean,</p> <p>8 sort of analyze later.</p> <p>9 And I don't know if I would even have</p> <p>10 thought about using any other specific tool to do</p> <p>11 that one way or the other. And I don't remember if</p> <p>12 I actually looked or not.</p> <p>13 Q So you just decided to write a script</p> <p>14 without ever looking to see if there were tools</p> <p>15 that could do what your script does?</p> <p>16 A I wasn't aware of a tool at that time. I</p> <p>17 probably -- I might have looked as well, but I</p> <p>18 can't tell if there's a tool which allowed me to do</p> <p>19 what Professor Kemerer specifically asked me to</p> <p>20 capture in this particular work.</p> <p>21 Q You said you weren't aware of a tool at</p> <p>22 that time.</p> <p>23 Are you now aware of a tool?</p> <p>24 A No. I don't -- I haven't looked.</p> <p>25 Q You haven't looked?</p>
<p style="text-align: right;">Page 287</p> <p>1 don't think I've come across a tool that would do</p> <p>2 all of this specific requests in a way that he</p> <p>3 wanted it, so writing a script was the best way I</p> <p>4 thought of doing it.</p> <p>5 Q So let me unpack that a little bit.</p> <p>6 Have you previously come across tools</p> <p>7 that would be capable of measuring API changes that</p> <p>8 didn't capture everything that Dr. Kemerer wanted</p> <p>9 to have measured?</p> <p>10 MR. RAMSEY: Objection. Form.</p> <p>11 THE WITNESS: No. API changes, no, I</p> <p>12 don't think so. I've not come across the tool.</p> <p>13 BY MR. PAIGE:</p> <p>14 Q So I'm trying to understand. I mean, it</p> <p>15 sounds to me like what you're saying is that there</p> <p>16 might be tools that measure API changes, but</p> <p>17 Dr. Kemerer wanted more than conventional tools can</p> <p>18 do.</p> <p>19 Is that what you're saying?</p> <p>20 A No. He had defined what he wanted to</p> <p>21 capture. The data sources that he used were</p> <p>22 publicly available data sources. I was asked to</p> <p>23 put together the -- based on his requirements, what</p> <p>24 he wanted to capture. And I don't know if there</p> <p>25 are specific tools that would do exactly that or</p>	<p style="text-align: right;">Page 289</p> <p>1 A No.</p> <p>2 Q Have you ever --</p> <p>3 A I mean, I haven't looked right now,</p> <p>4 recently, if you're asking me that.</p> <p>5 Q Have you ever heard of a tool called API</p> <p>6 check from Google?</p> <p>7 A API check. No.</p> <p>8 Q Do you know what it does?</p> <p>9 A I don't know if I came across it. I</p> <p>10 don't know.</p> <p>11 Q Have you heard of a tool called Doclava,</p> <p>12 that's D-O-C-L-A-V-A, from Google?</p> <p>13 A I don't know again.</p> <p>14 I don't know. I don't know if I've seen</p> <p>15 that or not, but I -- it doesn't sound familiar.</p> <p>16 Q Okay. Have you read any expert reports</p> <p>17 aside from Dr. Kemerer's and Dr. Schmidt's in this</p> <p>18 case?</p> <p>19 A I've skimmed through -- yes, I have</p> <p>20 skimmed through some of the other reports.</p> <p>21 Q What other reports have you skimmed</p> <p>22 through?</p> <p>23 A Professor Astrachan's report.</p> <p>24 Q Any others that you've skimmed besides</p> <p>25 Dr. Astrachan's?</p>

<p style="text-align: right;">Page 290</p> <p>1 A Probably -- I can't recall actually. 2 There might be. I can't recall any other specific 3 ones. 4 Q Okay. Do you have any opinions on what 5 was contained in Dr. Astrachan's report? 6 A I haven't formed a formal opinion, no. 7 Q Okay. Have you met with any Oracle 8 personnel? 9 A Oracle personnel. I have been introduced 10 to someone from Oracle, one of the lawyers, but I 11 haven't, like, worked with them or anything of that 12 sort. 13 Q So one of Oracle's lawyers. 14 Do you recall who it was? 15 A I can't, actually. 16 Q It's in-house, not at the Orrick firm, 17 right? 18 A In-house, yes. 19 Q Okay. Have you met any nonlawyers from 20 Oracle? 21 A I can't recall. 22 (Deposition Exhibit 1624 was marked for 23 identification by the court reporter.) 24 BY MR. PAIGE: 25 Q Mr. Chatterjee, I've put before you</p>	<p style="text-align: right;">Page 292</p> <p>1 Q And what has his role been on the case? 2 A I don't know what his role is. 3 Q Who is Xin Er Quek? 4 A Xin Er is -- she's a -- she's, I believe, 5 an associate at Keystone. 6 Q And what has her role been on the case? 7 A I don't know. 8 Q Mr. Richards we've spoke about. He's the 9 CEO of Keystone, correct? 10 A Yes, that's right. 11 Q And what role has he had on the case? 12 A He sort of has an overview role. I guess 13 he's working across experts. He sort of manages 14 the firm in general, so he might be contributing 15 from helping some of the data collection effort or 16 making sure that the -- keeping the relationships 17 with the experts. I don't know. 18 Q And who is Sergei Prutkin? 19 A Sergei Prutkin, he was the CEO of 20 Keystone. 21 Q He is no longer? 22 A He's no longer there. 23 Q Where is he now? 24 A I'm not sure. 25 And this is before I joined the case, I</p>
<p style="text-align: right;">Page 291</p> <p>1 Exhibit 1624, which are a number of disclosures 2 under the protective order that we received from 3 Oracle in October of 2015. 4 As I recall, you did not sign a 5 protective order, correct? 6 A I don't remember if I signed one or not. 7 But I don't think so. 8 Q Okay. Let me just ask you about these 9 folks. Jeff Marowits we've talked about. He's the 10 partner who brought this in. 11 Who is Samantha Price? 12 A She's a principal at Keystone. 13 Q What is her role in the case, to your 14 knowledge? 15 A I believe she was supporting Professor 16 Jaffe. 17 Q Anything else she's done on the case? 18 A I don't know. 19 Q Who is Sari Kerr, to your knowledge? 20 A Sari is -- she's an economist at 21 Keystone. 22 Q And what has her role been on the case? 23 A I don't know, actually, Sari's role. 24 Q Who is Bartley Tablante? 25 A He's an economist, as well, at Keystone.</p>	<p style="text-align: right;">Page 293</p> <p>1 guess. 2 Q It's October 2nd. 3 When did you join the case? 4 A Probably like sometime in October later 5 on. But I don't know. It's not -- I don't think 6 it was early October. 7 Q What does it mean for a Java class to be 8 abstract? 9 A What does it mean to be abstract? I 10 can't recall what it means to be abstract. 11 MR. PAIGE: Let's take a quick break and 12 see if we can finish up. 13 THE VIDEOGRAPHER: Going off the record. 14 The time is 5:31. 15 (Short break taken.) 16 THE VIDEOGRAPHER: Back on the record. 17 The time is 5:35. 18 MR. PAIGE: Mr. Chatterjee, thank you for 19 your time today. I have no further questions. 20 THE WITNESS: Okay. Thank you. 21 MR. RAMSEY: Nothing further here either. 22 THE VIDEOGRAPHER: Okay. This concludes 23 today's deposition of Rohit Chatterjee. The total 24 number of media used was four and will be retained 25 by Veritext Legal Solutions. The time is 5:35 p.m.</p>


Page 294

1 We are off the record.
 2 THE REPORTER: Would you like a copy?
 3 MR. RAMSEY: Yes, and a rough as soon as
 4 you can.
 5 THE REPORTER: Did you want the final
 6 tomorrow too?
 7 MR. RAMSEY: Yeah.
 8
 9 (TIME NOTED: 5:37 p.m.)
 10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25

Page 295

1
 2
 3
 4 I, ROHIT CHATTERJEE, do hereby declare under
 5 penalty of perjury that I have read the foregoing
 6 transcript; that I have made any corrections as
 7 appear noted, in ink, initialed by me, or attached
 8 hereto; that my testimony as contained herein, as
 9 corrected, is true and correct.
 10 EXECUTED this _____ day of _____,
 11 20____, at _____,
 (City) (State)
 12
 13
 14 _____
 ROHIT CHATTERJEE
 15
 16
 17
 18
 19
 20
 21
 22
 23
 24
 25

Page 296

1 I, the undersigned, a Certified Shorthand
 2 Reporter of the State of California, do hereby
 3 certify:
 4 That the foregoing proceedings were taken
 5 before me at the time and place herein set forth;
 6 that any witnesses in the foregoing proceedings,
 7 prior to testifying, were duly sworn; that a record
 8 of the proceedings was made by me using machine
 9 shorthand, which was thereafter transcribed under
 10 my direction; further, that the foregoing is a true
 11 record of the testimony given.
 12 I further certify I am neither financially
 13 interested in the action nor a relative or employee
 14 of any attorney or party to this action.
 15 IN WITNESS WHEREOF, I have this date
 16 subscribed my name.
 17
 18 Dated: _____
 19
 20

 21
 LORI STOKES
 CSR No. 12732
 22
 23
 24
 25

Page 297

1 ERRATA SHEET
 2 VERITEXT LEGAL SOLUTIONS
 3 800-567-8658
 4 ASSIGNMENT NO. CS2302034
 5 CASE NAME: Oracle America, Inc. v. Google Inc.
 6 DATE OF DEPOSITION: 4/28/2016
 7 WITNESS' NAME: Rohit Chatterjee
 8

PAGE/LINE(S)/	CHANGE	REASON
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____
11	_____	_____
12	_____	_____
13	_____	_____
14	_____	_____
15	_____	_____
16	_____	_____
17	_____	_____
18	_____	_____
19	_____	_____
20	_____	_____

 21 Rohit Chatterjee
 22 (Notary not required in California)
 23 SUBSCRIBED AND SWORN TO
 24 BEFORE ME THIS _____ DAY
 25 OF _____, 2016.

 NOTARY PUBLIC
 MY COMMISSION EXPIRES _____

75 (Pages 294 - 297)